
Mammography and Pap Smear Screening of Yaqui Indian Women

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Synopsis.....

The Pascua-Yaqui Tribe of Arizona receives its health care services at a local neighborhood health center in Tucson and a satellite clinic located on the reservation. Using a computerized data base from the health center, the authors determined the use rates by Pascua-Yaqui women ages 35-65 of the Papanicolaou smear and mammography screening.

Among active users of the health center, 31-36 percent had received a Papanicolaou smear, according to the yearly data bases examined from 1986 to 1990, while 65 percent of the women had received at least one smear test over the entire 5-year period. Regarding mammography screening, 41-43 percent of the women ages 50-65 had received a mammogram in the years studied, and 51-58 percent of the women ages 40-49 had been screened. In all, 67 percent had received at least one mammogram during the 1988-90 period when the center offered mammography.

This population of 35-65-year-old American Indian women, for whom financial access is not a barrier, were receiving Papanicolaou smears and mammograms at rates comparable with other segments of the U.S. population but at lower rates than those recommended by the American Cancer Society and National Cancer Institute.

The challenge for the health center is to reach those women who are eligible for services but do not use them and to address the nonfinancial barriers to care such as language, transportation, and gender-specific issues.

CANCER IS THE THIRD LEADING cause of death among American Indians, with a 1987 mortality rate of 83 per 100,000 population (1). Compared with rates for whites, the American Indian age-adjusted incidence rates for all cancers is 0.4-0.6 (2-4), and the standardized mortality ratio (SMR) is 0.6-0.9 (1,5,6). Cancer survival rates are poorer for American Indians, which may be related to more advanced disease at diagnosis and less likelihood of receiving treatment (7-10).

Samet and coworkers, using New Mexico Surveillance, Epidemiology and End Results data, found, after controlling for stage at diagnosis, that 5-year survival for breast cancer among American Indians was 43 percent and for cervical cancer 52 percent. That proportion compares with Hispanics' 62 percent for breast cancer and 63 percent for cervical cancer and non-Hispanic whites' 67 percent for breast and 63 percent for cervix (9). A further confounding factor in cancer mortality among

American Indians is racial misclassification. American Indians are often misclassified on death certificates, making interpretation of mortality statistics difficult (11-13).

Cervical cancer is one of the most common neoplasms in American Indian women, and in some tribes it has an incidence and SMR higher than those of other local populations (2,4,5). Cervical cancer is diagnosed at a more advanced stage among American Indians, suggesting that improved early detection would be a strategy to reduce morbidity and mortality rates (2,9,10,14-17). Similarly, breast cancer is diagnosed in American Indian women at more advanced stages (14) and survival rates for breast cancer are lower for American Indians than for other populations (2,9,14,15,17,18).

The data available regarding knowledge of and use of cancer screening services by American Indian women are very sparse. But American Indians

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have larger families, lower incomes, a higher percentage living below the poverty level, and higher unemployment rates compared with the rest of the U.S. population (1). These characteristics have been shown to be associated with lower levels of knowledge about, and utilization rates of, breast and cervical cancer screening services as well as a more advanced stage of diagnosis of both breast and cervical cancers (19-21).

The Pascua-Yaqui Indians in Arizona were officially recognized by the U.S. Government as an American Indian tribe in 1978. The Yaquis migrated to Arizona from northern Mexico in the early part of the 20th century as a result of persecution by the Mexican government. They have lived in villages outside of Tucson and a few other Arizona communities for the past 80 years. When the tribe became officially recognized in 1978, members became eligible for health services through the Indian Health Service.

Medical services for members of the Pascua-Yaqui Tribe are provided by a local neighborhood health center (NHC) in Tucson. The arrangement is unique in that the Indian Health Service has contracted with a private, nonprofit, provider on a capitated prepaid basis to provide health services to all of the members of the tribe who reside in Pima County. The NHC operates a satellite clinic on the Pascua-Yaqui reservation, where the majority of tribal members live.

The Pascua-Yaquis, therefore, offer a unique opportunity for the study of motivation for and adherence to cancer screening in an Indian population where financial access to care is not a barrier and where mammography services are available.

Using a computerized data base from a local NHC serving an American Indian population, the authors undertook a project to determine the use rates of Papanicolaou (Pap) smear and mammogra-

phy screening by Pascua-Yaqui women ages 35-65. The longer term goal of this project is to use these data and other information to increase use of Pap smear and mammography screening services by Pascua-Yaqui women.

Methods

Nearly 75 percent of Pascua Yaqui women receive their health care through the contracted health center, either at the satellite clinic on the reservation or at the NHC in Tucson. Although all enrolled tribal women who live in Pima County are eligible for care, some have other insurance plans and use other facilities. Routine health care services including Pap smears are available at both the satellite clinic and the NHC. The NHC, which is about 10 miles from the reservation, offers all other services including followup of abnormal Pap smears and mammography. (Routine mammography screening is not currently provided at most other Indian Health Service locations.) Transportation from the reservation to the NHC is provided by the Tribal Health Department when needed. Tribal members can and do receive care at both the satellite clinic and at the NHC, located near south Tucson.

The tribe maintains a roll of all members. Those women ages 35-65 listed on the tribal roll formed the study cohort. All women who had received services either at the reservation satellite clinic or at the NHC were included. For purposes of the study, tribal women were divided into two groups: (a) Eligible, that included all women eligible for NHC services and (b) Active Users, that included women who were regular users of health care services at the NHC. Group b is a subgroup of group a. All women listed on the tribal roll and living in Pima County were included in the Eligible Group. Active Users were women who had been to the NHC within 3 months of the study year(s). The use of cancer screening services and cancer status by those women who are members of the tribe but receive their health care in settings other than the NHC is unknown.

Women who received mammography or a Pap smear were identified from the NHC computerized billing data base, using Current Procedural Terminology (CPT) codes. The NHC uses 7601 or CPT code 88150 for Pap smear. Mammography was noted by 76090 for unilateral mammogram and 76091 for bilateral mammogram. The on-site radiology suite entered the billing data for mammography as did the on-site laboratory for Pap smears.

Pap smear use was examined by individual years 1986, 1987, 1988, 1989, and 1990. Pap smear use rates were calculated for each year for all women who were ages 35–65 during that year. The total numbers of Pap smears received (separated by at least 9 months) by each woman who was in the 35–65 age group for the entire 5-year period (1986–90) was also tallied. The accuracy of the billing records was dependent on the on-site radiology suite and laboratory rather than the medical provider who ordered or performed the test.

Mammography was more difficult to study because of three different recommended frequencies of screening for women between ages 35 and 65; once between ages 35 and 39 (baseline), every other year between ages 40 and 49, and annually at ages 50 to 65. Mammography use rates for women ages 50 to 65 were calculated for each year, 1988, 1989 and 1990. Mammography was not available at the NHC prior to 1988. For women ages 40 to 49 during the entire study period of interest, mammography use rates were calculated for each of the 2-year intervals, 1988–89 and 1989–90. Use rates were also calculated for women who were ages 35 to 39 during the entire 3-year interval, 1988–1990 (baseline examination).

Results

Table 1 shows the percentage of women in each group receiving Pap smears during each of the 5 years, 1986–90. Table 2 demonstrates the percentage of women receiving one, two, three, four, or five Pap smears, separated by at least 9 months, during 1986–90, by group. Table 3 shows the percentage of women receiving a mammogram by age group and by group category. Finally, table 4 shows the percentage of women ages 50 to 65 in each group receiving one, two, or three mammograms, or the percentage of those in the 40–49 age group receiving one or two mammograms during the 3-year period.

The numbers in the denominator get bigger each year because of the pyramidal nature of the population and increases in tribal enrollment (table 1). The annual performance year by year is about the same, averaging 35 percent for the Active Users. Finally, table 2 demonstrates that 65 percent of active users received at least one Pap smear during the 5-year period, and 42 percent received two or more.

Table 3 demonstrates a mammogram use rate of 43 percent for the women ages 50–65 and 58 percent for the women ages 40–49 by the third year

Table 1. Percentage of Yaqui Indian women ages 35–65 receiving a Pap smear, by year by group, 1986–90

Year	Eligible		Active users	
	Number	Percent	Number	Percent
1986	97 of 429	22.6	97 of 265	36.6
1987	100 of 453	22.1	100 of 287	34.8
1988	99 of 477	20.8	99 of 317	31.2
1989	119 of 508	23.4	119 of 330	36.0
1990	126 of 541	23.3	126 of 350	36.0

Table 2. Percentage of 403 eligible and 331 active user Yaqui Indian women ages 35–65 receiving 1–5 Pap smears separated by at least 9 months, by group, 1986–90

Number of smears	Eligible		Active users	
	Number	Percent	Number	Percent
1	76	18.9	76	23.0
2	72	17.9	72	21.8
3	50	12.4	50	15.1
4	14	3.5	14	4.2
5	4	1.0	4	1.2
At least 1	216	53.6	216	65.3

NOTE: Women must have been ages 35–65 during the entire period 1986–90.

Table 3. Percentage of Yaqui Indian women receiving a mammogram, by year, age category, and group, 1986–90

Year	Ages (years)	Eligible		Active users	
		Number	Percent	Number	Percent
1988	50–65	34 of 162	21.0	34 of 110	30.9
1989	50–65	57 of 179	31.8	57 of 137	41.6
1990	50–65	56 of 181	31.0	56 of 129	43.4
1988–89	40–49	55 of 156	35.3	55 of 107	51.4
1989–90	40–49	65 of 171	38.0	65 of 111	58.6
1988–90	35–39	13 of 32	40.6	13 of 26	50.0

NOTE: In multiple year data bases, women must have been of the indicated age during the entire period.

that mammography was available at the NHC. In table 4, 67 percent of women in both the 50–65 and 40–49 age groups got at least one mammogram over the 3-year interval.

Discussion

Through the use of a computerized data base, actual (as opposed to reported) Pap smear and mammography screening services for Pascua-Yaqui women ages 35–65 were determined. Additionally, since all tribal women were eligible for services through a contractual capitated system with a community neighborhood health center that maintains a computerized data base, entire population

Table 4. Percentage of Yaqui Indian women ages 50–65 with 1–3 mammograms or more and women ages 40–49 with 1 or 2 mammograms, 1988–90

Number of mammograms	Eligible				Active users			
	40–49		50–65		40–49		50–65	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1	40 of 117	34.2	26 of 125	20.8	40 of 88	45.5	26 of 88	29.5
2	19 of 117	16.2	23 of 125	18.4	19 of 88	21.6	23 of 88	26.1
3	N/A		10 of 125	8.0	N/A		10 of 88	11.4
At least 1.....	59 of 117	50.4	59 of 125	47.2	59 of 88	67.0	59 of 88	67.0

N/A=Not available.

use rates were available. With many of the eligible women receiving services at other health facilities or having moved to another location, these rates represent a worst case scenario. In other words, many women included in the denominator of the community use rates may be receiving adequate screening at other facilities. Since we do not have access to these data, however, these women are listed as not having received services.

At least 25 percent of all Yaqui women ages 35–65 receive Pap smear screening at the NHC. The Pap smear screening status of approximately 25 percent of the women who have other forms of insurance is unknown, according to unpublished data provided by Dr. Campos-Outcalt. The rate is 35 percent for active patients. Currently in progress is a knowledge, attitudes, and behavior (KAB) survey of a random sample of Yaqui women ages 35–65. This survey will help provide self-reported use rates for the entire community.

When a cumulative 5-year data base is examined to see how many women had received at least one Pap smear in the 1986–90 period, the use rate was 53.6 percent for all women in the Eligible Group and 65.3 percent for those in the Active Users Group. However, the number of women having received two, three, four, or five smears over the 5 years declines rapidly; only 1 percent received yearly smears for 5 years.

One study of Pap smear screening in New Mexico and Arizona has demonstrated that the percentage of Indian women (not Pascua-Yaqui) screened is much lower for those older than age 50 (26.6 percent) than those younger than age 50 (70.5 percent). As a result, cervical cancer was detected at much later stages among the older women (9). It appears that older Indian women are more reluctant to obtain Pap smears, although the extent to which underutilization of Pap smears in this age group can be attributed to patient characteristics versus health service characteristics is unknown. The current KAB survey of Pascua-Yaqui women

may help in understanding this issue. Another study has shown a marked underutilization of Pap smears by Alaskan Native women (16). A third study using the 1987 National Health Interview Survey data found similar underutilization by Hispanics, particularly those speaking only or mostly Spanish (22).

At one time, it was suggested in American Cancer Society (ACS) guidelines that Pap smear screening could be performed less frequently in older women. This has been modified to pertain only to women who have had regular, negative smears (23). This recommendation had been based in part on a study of women in Canada who had undergone Pap smears regularly. Mandelblatt and coworkers, however, examined Pap smear screening in a group of elderly low-income women. They found that these women were likely to have been lifelong nonusers or underusers of Pap smear screening, and mortality from cervical cancer had not declined for this group. An overall prevalence of abnormal Pap smears of 13.5 per 1,000 was found. The results suggested that cervical cancer screening should continue in older women if they have not received regular screening previously (24). Our data, which show inadequate screening in older Native American women, would indicate that screening should be encouraged and continued in this group.

Over the 3 years of mammography data collection, 21–31 percent of the eligible 50–65-year-old Yaqui women were receiving mammography screening; for 40–49-year-old-women, it was 35–38 percent. Among the Active User Group, this percentage rises to 31–43 percent for those ages 50–65 and 51–58 percent for those ages 40–49. Compared with rates in other populations of women, these are about the same, if not better (21,25). As mentioned previously, routine screening mammography is not currently provided at most other Indian Health Service locations.

The cumulative data base from 1988–90 offers

the opportunity to see how many women received mammography screening per ACS guidelines. It is impressive to note that 18.4 percent of eligible 50–65-year-old women received at least two screening mammograms over the 3-year period, and 26.1 percent of the active users were screened. For the women ages 40–49, 34.2 percent of the eligible and 45.5 percent of the active users received one mammogram over the 3-year period. Equally impressive, is that 40 percent of women ages 35–40 received a single (baseline) mammogram over the same 3-year period. Finally, 67 percent of women ages 40–65 received at least one mammogram.

Some questions arise as a result of this study. Although Pap smear screening has been available for a longer time at the NHC, its use rate was lower than that for mammography. Secondly, although all women on the tribal rolls are eligible for services at the NHC, some may get care elsewhere because of the availability of other insurance. It will be important to investigate how changing from one health center to another impacts on the use of Pap smear and mammography screening services. Additionally, it will be important to explore why many women who are active users do not receive screening.

In summary, this population of 35–65-year-old American Indian women, for whom financial access is not a barrier, were receiving Pap smear tests and mammograms at rates comparable with other populations in the United States but substantially below the rates recommended by the American Cancer Society and National Cancer Institute guidelines. Active users of the NHC eventually receive their Pap smears and mammography screening but not at the recommended frequencies. The challenge is to bring to the NHC those women who are eligible for services but do not use them and to increase the regular use of screening services by the active users of clinic services. The previously mentioned KAB questionnaire will help understand nonfinancial barriers to care, such as transportation, language, and cultural- and sex-specific issues.

References.....

1. Trends in Indian health, 1990. Indian Health Service, Rockville, MD, 1990.
2. Norsted, T. L., and White, E.: Cancer incidence among Native Americans of western Washington. *Int J Epidemiol* 18: 22–27 (1989).
3. Lanier, A. P., et al.: Cancer incidence in Alaskan natives. *Int J Cancer* 18: 409–412 (1976).
4. Mahoney, M. C., et al.: Cancer surveillance in a northeastern Native American population. *Cancer* 64: 191–195 (1989).

5. Mahoney, M. C., et al.: Cancer mortality in a northeastern Native American population. *Cancer* 69: 187–190 (1989).
6. Horner, R. D.: Cancer mortality in Native Americans in North Carolina. *Am J Public Health* 80: 940–944 (1990).
7. Smith, R. L., Salsbury, C. G., and Gilliam, A. G.: Recorded and expected mortality among the Navajo, with special reference to cancer. *J Natl Cancer Inst* 17: 77–89 (1956).
8. Young, T. K., and Frank, J. W.: Cancer surveillance in a remote Indian population in northwest Ontario. *Am J Public Health* 73: 52–55 (1983).
9. Samet, J. M., Key, C. K., Hunt, W. C., and Goodwin, J. S.: Survival of American Indian and Hispanic cancer patients in New Mexico and Arizona, 1969–82. *J Natl Cancer Inst* 79: 457–463 (1987).
10. Skubi, D.: Pap smear screening and cervical pathology in an American Indian population. *J Nurse Midwifery* 33: 203–207 (1988).
11. Hahn, R. A., Mendlein, J. M., and Helgerson, S. D.: Differential classification of American Indian race on birth and death certificates, U.S. reservation states, 1983–1985. *The IHS Provider* 18: 8–11 (1993).
12. Frost, F., Taylor, V., and Fries, E.: Race misclassification of Native Americans in a surveillance, epidemiology, and end results registry. *J Natl Cancer Inst* 84: 957–962 (1992).
13. Bleed, D. M., et al.: Cancer incidence and survival among American Indians registered for Indian Health Service care in Montana, 1982–1987. *J Natl Cancer Inst* 84: 1500–1505 (1992).
14. Creagan, E. T., and Fraumeni, J. F.: Cancer mortality among American Indians, 1950–67. *J Natl Cancer Inst* 49: 959–967 (1972).
15. Mahoney, M. C., et al.: Cancer surveillance in a northeastern Native American population. *Cancer* 64: 191–195 (1989).
16. Lanier, A. P., and Knutson, L. R.: Cancer in Alaskan Natives: a 15-year summary. *Alaska Med* 18: 32–41 (1986).
17. Mahoney, M. C., et al.: Cancer mortality in a northeastern Native American population. *Cancer* 64: 187–190 (1989).
18. Hart, B. L., et al.: Age and race related changes in mammographic parenchymal patterns. *Cancer* 63: 2537–2539 (1989).
19. Hayward, R. A., Shapiro, M. F., Freeman, H. E., and Corey, C. R.: Who gets screened for cervical and breast cancer? Results from a national survey. *Arch Intern Med* 148: 1177–1181 (1988).
20. Devesa, S. S.: Descriptive epidemiology of cancer of the uterine cervix. *Obstet Gynecol* 63: 605–612 (1984).
21. Farley, T. A., and Flannery, J. T.: Late-stage diagnosis of breast cancer in women of lower socio-economic status: public health implications. *Am J Public Health* 79: 1508–1512 (1989).
22. Harlan, L. C., Bernstein, A. B., and Kessler, L. G.: Cervical cancer screening: who is not screened and why? *Am J Public Health* 81: 885–890 (1991).
23. Think, D. J.: Change in American Cancer Society checkup guidelines for detection of cervical cancer. *CA Cancer J Clin* 38: 127–128 (1988).
24. Mandelblatt, J., Gopaul, I., and Wistreich, M.: Gynecological care of elderly women: another look at Papanicolaou smear testing. *JAMA* 256: 367–371, July 18, 1986.
25. Whitman, S., et al.: Patterns of breast and cervical cancer screening at three public health centers in an inner-city urban area. *Am J Public Health* 81: 1651–1653 (1991).